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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/681,497	10/08/2003	Stephen G. Bales	LA 001	5906

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EXAMINER	
DANIELS, MATTHEW J	
ART UNIT	PAPER NUMBER
1791	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/681,497	BALES, STEPHEN G.	
	Examiner	Art Unit	
	MATTHEW J. DANIELS	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5,6,10,14,16 and 18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5,6,10,14,16 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/28/09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 28 January 2009 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claim 5** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claimed polypropylene does not appear to be described as used in the process disclosed by the instant specification. Suitable thermoplastics appear to include only polyethylene, HDPE, polystyrene, and PVC (Spec., Page 5).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. In view of the multiple species claimed (zinc borate, boric acid, colemanite, different polymeric materials) and the differing scope of Claims 1 and 16, multiple rejections were required.

4. **Claims 1, 3-6, 8-12, and 14,** are rejected under 35 U.S.C. 103(a) as being unpatentable over Aida (USPN 5221781) in view of Lloyd (USPN 6368529). **As to Claim 1,** Aida teaches a method for forming lignocellulosic thermoplastic composite products comprising incorporating an amount of boron-containing fungicide prior to forming the composite product (3:39-55, 6:18-21, 6:62-7:20) and a variety of inorganic fillers (cols. 5-6). Aida also discloses that the fillers can be used in a most preferable range of 10-150 parts by weight per 100 parts resin, such as a themoplastic high density polyethylene (3:40-45), encompassing the claimed range.

Lloyd teaches calcium borate (Abstract), which is used interchangeably and as a substitute for zinc borate and acts as a filler. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Aida because (1) Lloyd teaches that an additional advantage of producing products with calcium borate in place of conventionally used zinc borate is that the calcium borates (a) have much better flow properties, making them easier to store and handle in processing equipment

(9:1-5) and (b) cause less premature wear and failure (1:52-55), and (c) are less toxic than the zinc borates, or (2) Aida suggests a variety of fillers (cols. 5-6), and Lloyd provides an inorganic colemanite filler that would provide the additional benefit that it would resist pests and fungi.

As to Claim 3, Aida teaches the following ranges:

100 parts resin (6:24-25)

5-200 parts organic fillers including wood powder (6:19-25)

5-200 parts of compounds including zinc borate (7:12-15, 6:67)

Aida lacks sufficient specificity to anticipate the claimed range. However, the claimed range would have been prima facie obvious over Aida's teachings to use the materials in combinations of two or more (7:4-5 and 7:33-34) and to adjust these ranges (7:12-28), making the amount of zinc borate a result-effective variable. Values within these ranges, such as 100 parts resin, 100 parts organic fillers, and 7 parts zinc borate, would fall within the claimed zinc borate range (7 parts zinc borate amounts to 3.4% by weight). **As to Claims 4 and 5**, Aida teaches at least wood and high density polyethylene (6:19 and 3:39-45). **As to Claim 6**, Aida is silent to calcium borate. However, Lloyd teaches calcium borate (Abstract). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Aida because Lloyd teaches that an additional advantage of producing products with calcium borate in place of conventionally used zinc borate is that the calcium borates (a) have much better flow properties, making them easier to store and handle in processing equipment (9:1-5) and (b) cause less premature wear and failure (1:52-55), and (c) are less toxic than the zinc borates. **As to Claims 8, 9, 11, and 12**, Lloyd teaches at least calcium polytriborate (3:39) that is either natural or synthetic (3:39-41), and colemanite (3:30-45,

especially 3:41). **As to Claim 10**, Aida suggests polyethylene and high density polyethylene (3:40-45). **As to Claim 14**, Aida teaches at least zinc borate and wood (6:67 and 6:19).

5. **Claims 1, 3-5, 6, 8, 9, 11, 12, and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Touval (USPN 3926883) in view of Pelikan (USPN 4104207). **As to Claim 1**, Touval teaches forming a polyolefin (2:11) thermoplastic product which comprises incorporating an amount of boron containing material which inherently acts as a fungicide in an amount between 2-12% of the article (7:30-60). Touval appears to be silent to the lignocellulosic material and the particular claimed amount, however, such composites are conventional and well known to those skilled in the art. See Pelikan (Abstract, lines 1-3, 6:19, 6:39-53). In particular, Pelikan suggests that the proportion of the vegetable filler material (6:39-40) in the polyolefin (6:19) can be 5 wt.% to 50 wt.% of the weight of the thermoplastic material (6:29-30). Of that 5 wt.% to 50 wt.%, only 10-30 wt.% is blowing agent (6:29-30). Therefore, Pelikan suggests that the vegetable material may comprise 50 wt.% to 95 wt.% thermoplastic.

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Pelikan, the method comprising incorporation of lignocellulosic filler, into that of Touval because (1) doing so would provide reinforcement (increased strength) and a foaming agent (decreased weight), and because this technique (lignocellulose as a reinforcement or carrier for blowing agent), is a conventional technique in the art that one would have found it obvious to apply to the Touval method, and (2) Touval suggests foams (Example 5), and Pelikan provides the ability to foam by using the lignocellulose reinforcement as a carrier for a foaming agent.

As to Claims 3-6, 8, 9-11, 12, and 15, Touval teaches polyethylene (2:10-11) which is a thermoplastic, and colemanite (Table 1, column 7, colemanite is a naturally occurring calcium borate) used in an amount of 3-5% (Table 1, samples 7-8), which would inherently provide the claimed degree of resistance to visual impairment. Additionally, the amount of colemanite is clearly a result effective variable that one would optimize to arrive at the claimed range which is not substantially different than the amounts disclosed by Touval in Col. 7. Pelikan clearly suggests pine wood as a lignocellulosic material (6:66).

6. **Claims 1, 3-6, 8-12, 15, and 16, and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelikan (USPN 4104207) in view of Lloyd (USPN 6368529). **As to Claims 1 and 16**, Pelikan teaches a method for forming composite products which incorporate a polyolefin thermoplastic (7:19-20) material, a lignocellulosic material (7:21-22 and Abstract, line 3), and a blowing agent (7:23-24, bubbles). Claim 1 of the Pelikan suggests that it would have been obvious to provide a composite consisting of only these components. With respect to the claimed amount of the polyolefin, Pelikan suggests that the proportion of the vegetable filler material (6:39-40) in the polyolefin (6:19) can be 5 wt.% to 50 wt.% of the weight of the thermoplastic material (6:29-30). Of that 5 wt.% to 50 wt.%, only 10-30 wt.% is blowing agent (6:29-30). Therefore, Pelikan suggests that the vegetable material may comprise 50 wt.% to 95 wt.% thermoplastic.

Although silent to the borate materials, Lloyd teaches the claimed amount (4%) of calcium borate in the form of colemanite incorporated into a composite material (3:45-62).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Pelikan because (1) Pelikan provides a material which includes wood or other lignocellulosic materials and Lloyd teaches that calcium borate may be used as a pesticide against fungi and insects that destroy wood, thus it would have been obvious to apply the improvement of Lloyd to the material of Pelikan, with the expected result that the same fungi and insect resistance would be provided to the Pelikan material, and/or (2) the calcium borate of Lloyd would act as a flame retardant (cols. 7 and 8), and Pelikan specifically suggests a flame retardant (4:28-31).

As to Claims 3-6, 8-10 and 12, Lloyd teaches the claimed amount (3:45-62) of naturally occurring colemanite (calcium borate), and Pelikan clearly suggests pine wood as a lignocellulosic material (6:66) and suggests polyethylene (6:5) as one matrix material. **As to Claim 18**, Pelikan teaches a method for forming composite products which incorporate a polyolefin (6:5) thermoplastic (7:19-20) material, a lignocellulosic material (7:21-22 and Abstract, line 3), a color additive (6:27-28), and softeners or stabilizers (6:22) which may be considered to be coupling agents since they would help the polymer conform and bond to the lignocellulose, and a lubricant (water, 6:48). With respect to the claimed amount of the polyolefin, Pelikan suggests that the proportion of the vegetable filler material (6:39-40) in the polyolefin (6:19) can be 5 wt.% to 50 wt.% of the weight of the thermoplastic material (6:29-30). Of that 5 wt.% to 50 wt.%, only 10-30 wt.% is blowing agent (6:29-30). Therefore, Pelikan suggests that the vegetable material may comprise 50 wt.% to 95 wt.% thermoplastic.

Pelikan is silent to (a) the high density polyethylene and (b) the borate materials. However, these aspects of the invention would have been obvious for the following reasons:

(a) The Examiner's position is that Pelikan expressly suggests a genus of polyethylene materials ("all thermoplastics and related plastics may be used....e.g. polyvinyl chloride, polyolefins, polyethylene...", Pelikan, 6:3-5), and that the genus of polyethylene materials is sufficiently small that the ordinary artisan would have immediately envisioned the claimed high density polyethylene (HDPE). Alternatively, one of ordinary skill in the art at the time of the invention would have found it obvious to use an HDPE in place of the polyethylene suggested by Pelikan since it would have been a recognized and obvious substitute in the art.

(b) Lloyd teaches the claimed amount (4%) of calcium borate in the form of colemanite incorporated into a composite material (3:45-62).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Pelikan because (1) Pelikan provides a material which includes wood or other lignocellulosic materials and Lloyd teaches that calcium borate may be used as a pesticide against fungi and insects that destroy wood, thus it would have been obvious to apply the improvement of Lloyd to the material of Pelikan, with the expected result that the same fungi and insect resistance would be provided to the Pelikan material, and/or (2) the calcium borate of Lloyd would act as a flame retardant (cols. 7 and 8), and Pelikan specifically suggests a flame retardant (4:28-31).

7. **Claims 1, 3-6, and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelikan (USPN 4104207) in view of Borogard ZB (of record, 3/20/08 IDS). While it is noted that the IDS appears to cite the Borogard ZB sheet as having been published July 26, 2003, the document states on its face that it was "Accepted" on July 26, 1993. The 2003 citation in the

IDS is believed to be a typographical error. **As to Claim 1**, Pelikan teaches a method for forming composite products which incorporate a thermoplastic (7:19-20) material, a lignocellulosic material (7:21-22 and Abstract, line 3), and a blowing agent (7:23-24, bubbles). Claim 1 of the Pelikan suggests that it would have been obvious to provide a composite consisting of only these components. With respect to the claimed amount of the polyolefin, Pelikan suggests that the proportion of the vegetable filler material (6:39-40) in the polyolefin (6:19) can be 5 wt.% to 50 wt.% of the weight of the thermoplastic material (6:29-30). Of that 5 wt.% to 50 wt.%, only 10-30 wt.% is blowing agent (6:29-30). Therefore, Pelikan suggests that the vegetable material may comprise 50 wt.% to 95 wt.% thermoplastic.

Although silent to the zinc borate, Borogard ZB teaches incorporation of zinc borate at a loading of 3-20 parts or 0.5 to 8% for use as a biocide and fire retardant (phrase below title, also Plastic and Rubber Products and Wood Composite Materials section on Page 2 of 3). This quantity reads on the claimed amount of zinc borate.

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Borogard ZB into that of Pelikan because (1) Pelikan provides a PVC material incorporating wood, and Borogard ZB expressly suggests the zinc borate for use with PVC, plastics, and wood composite materials, and/or (2) the calcium borate of Borogard ZB would act as a flame retardant (cols. 7 and 8), and Pelikan specifically suggests a flame retardant (4:28-31).

As to Claims 3, 11, 14, Borogard ZB teaches zinc borate and suggests that it be incorporated into plastics and wood composites in the claimed amount (Page 2 of 3). **As to**

Claims 4, 5, and 10, Pelikan clearly suggests pine wood as a lignocellulosic material (6:66) and polyethylene as a thermoplastic (6:19).

Response to Arguments

8. Applicant's arguments filed 28 January 2009 have been fully considered but they are not persuasive. The arguments appear to be on the following grounds:

a) (Page 4) Aida provides a flame retardant composite. The required loadings of either zinc borate or colemanite required to flame retard a polyolefin composite would far exceed Lloyd's range of 0.1 to 4%. See, for example, O'Brien who teaches a fire retardent which provides about 12 to 36 parts per hundred o' the resin. O'Brien's minimum zinc borate percentage is 7.1% and the maximum loading would be 23%. One skilled in the art would not be motivated to use Lloyd's 0.1 – 4% range in the Aida process.

b) (page 5) Touval's Example 3 discloses that for polyolefins, 4 wt.% is too low, since such samples will readily burn in air.

c) (Page 6) The 5/30/08 arguments present unexpected results. No prior art existed prior to Nov. 2002 that described the mold resistance of a boron fungicide in a lignocellulosic thermoplastic composite. Colemanite was shown to be ineffective in resisting mold in plastics, and zinc borate was through by experts to be ineffective in resisting mold. In July 2005, a filing of an international application by one of the inventors of USPN 6,368,529 states that the addition of zinc borate to reduce UV degradation of resin composites was surprising.

d) Pelikan teaches a maximum of 23% lignocellulosic material. The 57.8 minimum amount of thermoplastic material is significantly greater than the 25% minimum identified in the present invention. Additionally, the addition of lignocellulosic material would provide an unacceptable component to Touval's invention. Stannic oxide stimulates glowing of burning wood, and wood that has been effectively treated should not exhibit afterglow.

e) There is no valid scenario for incorporating the Lloyd borates into the Pelikan material. 1% was a recognized amount to protect from insects, and in view of the expense of zinc borate, one would not add more than required. University and government studies confirmed that relatively low amounts of zinc borate were required to provide fungal resistance. As described above, neither zinc borate nor colemanite are effective polyolefin flame retardants at the 0.1 to 4% range.

f) Pelikan restricts the lignocellulosic content to 23% and the thermoplastic component to 57.8%, which is significantly less than the range of the present invention. One having knowledge of the Borogard ZB reference would have also been aware that 1% was enough to adequately control the decay in wood plastic composites. Since Pelikan has no suggestion of wood preservation, there is no motivation to combine the teachings.

9. Reponse:

a) It is respectfully submitted that the O'Brien reference appears to support the Examiner's position, rather than Applicant's position since Applicant appears to admit that O'Brien suggests or envisions including 7.5% zinc borate, which is within the claimed range regardless of its concurrent use with other flame retardants.

b) Touval suggests broadly that 0.5 to 25 parts flame retardants per 100 parts resin are sufficient (col. 2). It is submitted that Touval's example 3 does not set lower limits, but merely demonstrates useful mixtures.

c) The Examiner submits that the utility of zinc borate was well established prior to the instant application in view of the Borogard ZB reference, which suggests use of zinc borate in the claimed manner. Colemanite was recognized in the art for its various properties (see Lloyd). The Examiner respectfully disagrees that the results were unexpected.

d) Applicant appears to admit that Pelikan teaches or suggests 57.8 wt.% thermoplastic, which meets the claimed limitation. The instant invention claims a range of 25-75 wt.% polyolefin, which overlaps with the range asserted to be found in Pelikan. It is submitted that Touval already provides a method to reduce glow when used with presumably flammable polyolefinic materials, and therefore it is unclear why introduction of a flammable reinforcement would be contrary to the Touval process.

e) It is respectfully submitted that the pertinent question does not only encompass what was a recognized suitable amount, but also whether the claimed amount would have been obvious over those disclosed by the prior art. Several references appear to demonstrate zinc borate or calcium borate quantities which overlap with the claimed amount. Even if used for different purposes, the evidence suggests that the claimed amounts are obvious over the prior art.

f) It should be noted that the amount of thermoplastic present in the Pelikan material overlaps with the claimed range. Applicant's arguments appear to admit to 57.8 wt.% thermoplastic, while the claimed range includes 25-75% polyolefin. It is unclear how these amounts are distinguishable. Pelikan need not suggest wood preservation in order to make a valid

combination if one skilled in the art would have recognized wood preservation or fire retardance as desirable for use with the Pelikan process.

Conclusion

10. Wold (US 5,435,954) is cited as teaching the conventionality of mixing wood fibers and high density polyethylene to form a composite. Any additional rejections over this reference would be cumulative over those above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. DANIELS whose telephone number is (571)272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew J. Daniels/
Primary Examiner, Art Unit 1791
4/13/09